

THE MINERAL INDUSTRY OF THE PHILIPPINES

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The Republic of the Philippines, which is a developing democratic republic, is located just north of the equator about 1,100 kilometers (km) east of the coast of the mainland of Southeast Asia. The country is an archipelago that comprises 7,000 islands, of which fewer than 900 are inhabited by the country's 78 million people; the major islands are Luzon in the north, Visayas in the middle, and Mindanao in the south. The archipelago is within the Pacific "Rim of Fire," which is so-called because of the intense volcanic activity at the margins of the tectonic plates and is well-known for epithermal gold, porphyry copper-gold, and volcanic-hosted massive sulfide deposits (U.S. Department of State, 2003§¹).

In 2002, the Philippines was a significant producer of chromite, copper, gold, and nickel and had in the recent past ranked among the world's top 10 producers. Other important mineral commodities were coal, gypsum, silver, and sulfur. Significant deposits of clay, limestone, marble, phosphate, and silica also occur. Until the early 1990s, the mineral industry, which was considered to be the backbone of the country's economy, contributed about 30% to the country's gross domestic product (GDP). By 2002, however, the mining industry's contribution had dropped to about 2% of the \$77.1 billion GDP (Resource Information Unit, 2002, p. 21; U.S. Embassy, Manila, Philippines, 2002; U.S. Department of State, 2003§). This drop has been attributed to the effects of low international metal prices accompanied by high operating and production costs, political instability, labor problems, a global slump in exploration expenditures, and such natural disasters as earthquakes, floods, landslides, tsunamis, typhoons, and volcanic eruptions.

The GDP growth rate in the Philippines accelerated from 3.4% in 2001 to 4.6% in 2002 owing mainly to the resilience of the service sector, gains in the industrial sector's output, and increased exports (U.S. Department of State, 2003§).

Government Policies and Programs

In February, the Mindoro Oriental Province legislated a 25-year moratorium on all major mining projects in the region. The ordinance established that it was unlawful for any person or entity to engage in land clearing, prospecting, exploration, drilling, excavation, mining, or transport of mineral ores preparatory to all forms of mining operations until 2027. The decree, which took 6 months to pass, essentially was to prohibit Crew Development Corp. of Canada from developing a large-scale nickel-cobalt mining project in the area that would straddle two provinces, the other being Mindoro Occidental. Local opposition to large-scale mining projects was established principally owing to the collapse of a tailings dam at the Marcopper copper mine on the island of Marinduque in 1996 that was owned and operated by Placer Dome Inc., also of Canada. The waste from the dam's failure contaminated a major river system and destroyed the livelihoods of farmers and fishermen of Marinduque, which is only about 50 km from Mindoro Oriental (Drillbits & Tailings, 2002§).

Environmental Issues

The Department of the Environment and Natural Resources (DENR) was the primary Government agency responsible for conservation, management, development, and proper use of the country's natural resources, which included its minerals. The Departments of Agrarian Reform and of Agriculture were secondary environmentally oriented Government agencies.

The Philippines' environmental problems included air pollution from motor vehicles, air and water pollution from mining operations and other industrial activities, soil erosion, uncontrolled deforestation, and natural phenomena such as earthquakes, landslides, tsunamis, typhoons, and volcanic activity.

The international environmental agreements that the Philippines was party to were Biodiversity, Climate Change, Desertification, Endangered Species, Hazardous Wastes, Law of the Sea, Marine Dumping, Nuclear Test Ban, Ozone Layer Protection, Ship Pollution, Tropical Timber 83, Tropical Timber 94, and Wetlands. The Philippines has signed but had not ratified the Climate Change-Kyoto Protocol (U.S. Central Intelligence Agency, 2003§).

Production

Although the Philippines did not rank within the top 10 of world producers for any mineral commodity in 2002, the country did rank 11th in mined nickel production in 2002 (Kuck, 2003).

The Philippines was the world's second leading producer of geothermal power after the United States. Geothermal power accounted for about 16% of the country's installed power generation capacity, which was about 45 million megawatts (U.S. Central Intelligence Agency, 2003§).

¹ References that include a section mark (§) are found in the Internet References Cited section.

Trade

Japan was the primary market for Philippine mineral products. A majority of Philippine copper concentrates and nearly all the country's production of nickel were exported to Japan. Philippine Associated Smelting and Refining Corp. (PASAR) smelted the remaining copper concentrates into copper cathodes at Isabel, Leyte Province, on Leyte Island, for export, again primarily to Japan. PASAR was the country's only copper producer and also was one of Asia's largest copper smelters/refineries.

Two-way U.S. trade with the Philippines was nearly \$18.3 billion in 2002. Almost 20% of the Philippines' imports in 2002 came from the United States, and about 25% of Philippine exports went to the United States. Led by copper, Philippine mineral exports were valued at \$512 million in 2002; this was a decrease of 5% from that of 2001 (U.S. Department of State, 2003§).

Commodity Review

Metals

Copper.—Early in January, the Chinese trading house Minmetals signed an agreement with PASAR, which owned and operated the Philippines' only copper smelter, to finalize a series of trade links first established in late 2001. Minmetals was to purchase at least 24,000 t of copper cathode, which was estimated to be worth \$36 million, from PASAR in 2002 (Metal Bulletin, 2002). Beginning September 1, a 55-day scheduled maintenance program slightly reduced (by about 1%) copper cathode production by PASAR (Mining Journal, 2002b).

Gold.—Early in the year, Sydney, Australia-based Climax Mining Ltd. modified its plans for the Dinkidi ore body within the Didipio Valley project on Luzon Island owing to political uncertainty and low metal prices. Climax's new plans, which followed 6 months of optimization studies that ended in December 2001, involved a smaller scale staged development of the Dinkidi gold-copper mine, which is located about 200 km northeast of Manila. The newer concept was based on extraction of the high-grade ore by cut-and-fill methods together with a small open cut operation. The revised plan estimated a cost of \$32 million for initial capital expenditure, rather than the \$138 million estimated for the original concept, and a development period of about 6 months. The first stage was to mine the ore of the central core at a rate of 300,000 metric tons per year (t/yr) at a 5-gram-per-metric-ton (g/t) cutoff combined with an open cut operating at 200,000 t/yr for an 8-year period (Gold Gazette, 2002a).

Mining operations at Philex Gold Inc.'s Bulawan gold-silver mine on Negros Island, Negros Occidental Province, ceased April 30 when the remaining broken ore was exhausted. The mine was decommissioned in May following the cleanup of the carbon-in-leach circuit [which resulted in an additional 36.2 kilograms (kg) of gold]. Development work had been concluded in November 2001. Total output since the mine began production in 1996 was 12,934 kg of gold and 16,973 kg of silver (Philex Gold Inc., 2002, 2002§).

Greenstone Resources NL of Perth, Australia, reached an agreement with Manila-based JCG Resources Corp. that would allow Greenstone to earn an 80% interest in the multi-million-ounce Siana gold project, which had an estimated indicated gold resource of 825,000 troy ounces (25,700 kg), by completing a bankable feasibility study of the project. With further exploration drilling, the estimated indicated resource could increase to 1 million troy ounces (31,000 kg) of gold. The Siana Mine, which is located adjacent to Anglo American Plc's 15-million-troy-ounce (470,000 kg) Boyongan copper-gold deposit in the established gold mining region of Surigao del Norte, was one of the Philippines' longest established gold mining operations. The Siana Mine was closed prematurely following a 1990 typhoon that caused a pit wall failure and flooding after exceptional rains (Gold Gazette, 2002b; Mining Australia, 2002§).

Canada's TVI Pacific Inc. began commissioning the oxide plant at its wholly owned Canatuan gold-silver mine in December. Plant feed, which was from stockpiled tailings from a previous small-scale operation, was at 50 metric tons per day (t/d) at yearend 2002. This amount was to increase during a 2-year period to 500 t/d, which was to result in an overall oxide mine life of from 6 to 10 years. The mine is located in Zamboanga del Norte Province. The Government had given TVI the go-ahead to begin commercial production in November (Mining Journal, 2002a; TVI Pacific Inc., 2003).

Nickel.—In August, the DENR approved Manila-based Rio Tuba Nickel Mining Corp. to build and operate a \$175 million nickel processing plant. The DENR issued the environmental compliance certificate for Rio Tuba to operate its proposed hydrometallurgical processing complex in July. The complex, which will be located in Bataraza on Palawan Island, was to consist of a hydrogen sulfide plant, a limestone quarry, a water and drainage system, two tailing dams, a 9.9-megawatt coal-fired powerplant, port facilities, and other supporting structures. The plant was expected to produce 19,000 dry metric tons of mixed sulfide of nickel and cobalt for export to Japan. Rio Tuba announced that the proposed plant was designed to produce 10,000 t/yr of nickel and 700 t/yr of cobalt. Rio Tuba was planning to build the complex as a joint venture—Sumitomo Metal Mining Co., which was Japan's leading nickel producer, would hold a 54% stake; Mitsui & Co. Ltd. and Nissho Iwai Corp., each headquartered in Japan, an 18% stake; and Rio Tuba, the remaining 10% (Mining Journal, 2002c; Dow Jones Business News, 2002§).

Mineral Fuels

Petroleum and Natural Gas.—In October 2001, exploration underneath the Malampaya gasfield revealed an estimated 85 million barrels of oil condensate. Shell Philippines Exploration B.V. anticipated that increased crude oil production would range from 35,000

to 50,000 barrels per day by 2003. In addition, six other offshore explorations were conducted in the Malampaya Basin led by Nido Petroleum Ltd., Philippines National Oil Co., PNOC Exploration Corp., Trans-Asia Oil and Energy Development Corp., Unocal Corp., and Philodril Corp.

Infrastructure

The transportation infrastructure of the Philippines was moderately developed. Of the 199,950 km of roads, 39,590 km was paved and 160,360 km was unpaved. Inland waterways, of which 3,219 km was usable for shallow draft [less than 1.5-meter (m) vessels], were of little importance to the transportation industry. The public sector railway system consisted of 492 km of narrow-gauge (1.067-m) track. Of the 257 airports, 82 had permanent-surface runways. International shipping ports included Batangas, Cagayan de Oro, Cebu, Davao, Guimaras Island, Iligan, Iloilo, Jolo, Legaspi, Manila, Masao, Puerto Princesa, San Fernando, Subic Bay, and Zamboanga. The merchant marine fleet included 119 bulk or combination bulk ore freighters, 42 petroleum-oil-lubricant tankers, 8 liquefied gas tankers, 4 chemical tankers, and 2 specialized tankers. Pipelines included 357 km for petroleum products and 100 km for natural gas (U.S. Central Intelligence Agency, 2003\$).

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Major Sources of Information

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Major Publications

Central Bank of the Philippines, Manila:

Statistical Bulletin and Annual Report.

Chamber of Mines of the Philippines, Manila:

Newsletter and Annual Report.

Mines and Geosciences Bureau, Manila:

Mineral News Service and Annual Report.

TABLE 1
PHILIPPINES: PRODUCTION OF MINERAL COMMODITIES¹

(Metric tons unless otherwise specified)

Commodity ²	1998	1999	2000	2001 ^e	2002 ^e
METALS					
Chromium, chromite, gross weight	53,871	19,566	861 ^r	1,932 ^{r, 3}	2,000
Copper:					
Mine output, Cu content	45,400	34,600	129,768	20,322 ³	18,364 ³
Metal:					
Smelter	161,600	162,000	160,000 ^r	165,000 ^{r, 3}	165,800 ³
Refined	152,431	147,982	150,000 ^r	164,500 ^{r, 3}	144,300 ³
Gold, mine output, Au content kilograms	34,038	31,050	36,540	33,840 ³	65,200 ³
Iron and steel, steel, crude thousand tons	860	530 ^r	530 ^r	530 ^{r, 3}	530
Lead, metal, secondary refined	17,000 ^e	12,389	16,218	24,000 ^r	24,000
Nickel, mine output, Ni content	23,713	20,689	17,388	27,359 ³	26,532 ³
Silver, mine output, Ag content kilograms	18,220	18,214	23,534	33,600	8,800
INDUSTRIAL MINERALS					
Cement, hydraulic thousand tons	12,888	12,566	11,959	8,653 ³	9,000
Clays:					
Bentonite	3,900	1,844	2,800	5,128 ³	5,500
Red	1,180	--	-- ^e	4,983 ³	5,000
White	1,783	5,465	1,598	5,111 ³	5,000
Other	6,000	--	771	800	800
Feldspar	2,938	16,909	3,440 ^r	33,122 ³	30,000
Lime	5,997	7,829	9,000	9,000	9,000
Perlite	6,356	10,265	5,650	6,000	6,000
Phosphate:					
Guano	25 ^e	--	--	-- ^r	-- ³
Phosphate rock thousand tons	8,000	181,000	434,000	450,000	400,000
Pyrite and pyrrhotite, including cuprous, gross weight ^e	320,000	320,000	300,000	300,000	300,000
Salt, marine	727,754	704,347	589,528	600,000	600,000
Sand and gravel:					
Silica sand thousand tons	16	64	70	70	70
Other ^{e, 4} thousand cubic meters	15,000	15,000	15,000	15,000	15,000
Stone:					
Dolomite	210,230	839,102	823,302	802,189 ³	800,000
Limestone ⁵ thousand tons	27,714	16,738	22,244	23,000	20,000
Marble, dimension, unfinished cubic meters	98,000	9,826	14,804	15,000	15,000
Volcanic cinder ^e do.	2,000	2,000	2,000	2,000	2,000
Tuff	1,540	1,460	1,662	1,500	1,500
Quartz ^e	50,000	50,000	50,000	50,000	50,000
Crushed, broken, other ⁶ thousand cubic meters	1,570	2,388	2,684	2,500	2,500
Sulfur, all forms ^e	132,000	133,000 ³	134,000 ³	170,000	180,000
MINERAL FUELS AND RELATED MATERIALS					
Coal, all grades thousand tons	930 ^r	1,205 ^r	1,218 ^r	1,230 ^{r, 3}	1,665 ³
Petroleum:					
Crude thousand 42-gallon barrels	300 ^e	400	400 ^e	475 ^{r, 3}	2,020 ³
Refinery products: ^e					
Liquefied petroleum gas do.	5,110 ³	5,500	5,500	6,000	25,200
Gasoline do.	19,345 ³	18,500	18,500	19,000	79,800
Jet fuel do.	8,380 ³	6,500	6,500	7,000	29,400
Kerosene do.	4,380 ³	4,500	4,500	5,000	21,000
Distillate fuel oil do.	36,865 ³	40,000	40,000	40,000	168,000
Residual fuel oil do.	42,340 ³	47,000	47,000	47,000	215,000
Refinery fuel and losses do.	4,745 ³	5,000	5,000	5,000	230,000
Other do.	12,775 ³	10,000	10,000	10,000	225,000
Total do.	133,940 ³	137,000	137,000	139,000	993,400 ³

See footnotes at end of table.

TABLE 1--Continued
PHILIPPINES: PRODUCTION OF MINERAL COMMODITIES¹

⁶Estimated; estimated data are rounded to no more than three significant digits; may not add to total shown. ⁷Revised. -- Zero.

¹Table includes data through September 11, 2003.

²In addition to the commodities listed, the Philippines produced platinum-group metals as byproducts of other metals, but output was not reported quantitatively and no basis is available to make reliable estimates.

³Reported figure.

⁴Included "pebbles" and "soil" not further described.

⁵Excluded limestone for road construction.

⁶Included materials described as rock, crushed or broken; stones, cobbles, and boulders; rock aggregates; and broken adobe.